

REMARKS

Upon entry of the amendments, claims 1-8 and 25-28 will be all the claims pending in the application.

Applicants have made non-narrowing amendments to claims 1-3 and 6 that clarify the scope of the claimed invention. Applicants have also added new claim 25, which is supported by original claim 1, and new claims 26-28, which are supported by original claim 6. No issue of new matter is raised.

I. Paragraph Nos. 1-2: Restriction Requirement

Applicants affirm their election of Group I, claims 1-8, drawn to a container.

II. Paragraph Nos. 4-6: Rejections Under 35 U.S.C. § 112

Claims 2-3 are rejected under 35 U.S.C. § 112, first paragraph.

Claims 2-3 and 6 are rejected under 35 U.S.C. § 112, second paragraph.

Applicants respectfully traverse each of the rejections.

Regarding the §112, first paragraph, rejection of claim 2-3, Applicants respectfully submit that a patent application need not teach, and preferably omits, that which is known in the art at the time the application is filed (*see, In re Buchner*, 18 USPQ2d 1331, 1332 (Fed. Cir. 1991)).

Applying the law to the facts of the present case, Applicants are not claiming a new type of nano-composite in claims 2-3. The nano-composites recited in present claims 2-3 were known *per se* at the time the application was filed, and are also named DLN. Instead, the novelty and nonobviousness of the claimed invention is based on the claimed container that comprises the combination of a polymer material and a material with a barrier effect applied as a coating on a substrate of the polymer material. Because DLN was known at the time the present

application was filed, a person of ordinary skill in the art would be able to make and use the invention of claims 2 and 3.

Regarding the §112, second paragraph, rejection of claims 2-3, the scope of the recitations "a nano-composite comprising amorphous carbon with a polymer tendency" or "a nano-composite comprising an amorphous carbon with a polymer tendency and metal atoms" is clear and definite when properly construed in light of (i) the fact that DLN was known *per se* at the time the application was filed and (ii) according to the teachings of the underlying disclosure.

First, as mentioned, DLN was known *per se* at the time the application was filed.

Second, as described from page 4, line 30 through page 5, line 2, the claimed nano-composite comprises amorphous carbon with a polymer tendency. These carbon-type nano-composites (or DLN) are composites with reciprocally interleaved dual networks, stabilized and random. One network comprises amorphous carbon with a polymer tendency (a-c:H, with up to 50% sp³ bonds). The other network may comprise, *e.g.*, silicon stabilized by oxygen (a-Si:o). In another embodiment of the invention, the nano-composite comprises metal atoms in addition to amorphous carbon with a polymer tendency.

Finally, regarding the §112, second paragraph, rejection of claim 6, Applicants have addressed this rejection by amending claim 6, and adding new claims 26-28.

For the foregoing reasons, Applicants respectfully request that the Examiner reconsider and withdraw these §112 rejections.

III. Paragraph Nos. 8-9: Rejections Under 35 U.S.C. § 103

Claims 1 and 4-8 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over EP 0 773 166 ("Nagashima") in view of the article to Danzer ("Danzer").

Claims 2-3 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Nagashima in view of Danzer and further in view of FR 2,712,310 ("Benmalek").

Applicants respectfully traverse each of the rejections.

Claim 1 is the independent claim. It recites:

1. A container having a heterogeneous structure, comprising a material with a barrier effect and a polymer material, wherein the material with a barrier effect is an amorphous carbon material with a polymer tendency which is applied as a coating on a substrate of the polymer material.

A key feature of the present invention is that the coating of the material with a barrier effect is linked to the polymer substrate by a chemical and, hence, extremely powerful bond (*see*, page 6, lines 8-25). The powerful bond is nevertheless accompanied by a relative capacity for deformation in the coating. The combination provides a structure that no longer exhibits the disadvantages, *e.g.*, layers becoming unstuck, of prior art containers made with hard carbon or DLC coatings.

Surprisingly, and contrary to accepted wisdom¹, the claimed material with a barrier effect, *i.e.*, the amorphous carbon material with a polymer tendency, may be applied as a coating on a polymer substrate resulting in reinforced barrier properties (*see*, page 4, lines 16-29). This barrier effect provided by the claimed amorphous carbon with a polymer tendency is another key feature of the invention.

The combined disclosures of Nagashima and Danzer do not disclose or suggest a container comprising a material with a barrier effect and a polymer material, wherein the material with a barrier effect is an amorphous carbon material with a polymer tendency which is applied as a coating on a substrate of the polymer material.

As the Examiner has pointed out, the primary reference Nagashima fails to disclose a barrier material of amorphous carbon with a polymer tendency.

The Examiner asserts that Danzer teaches the use of barrier coatings of amorphous

¹ Proceeding contrary to accepted wisdom in the art may be evidence of nonobviousness (*see, In re Hedges*, 783 F.2d 1038 (Fed. Cir. 1986)).

carbon with a polymer tendency. The Examiner concludes that it would have been obvious to modify Nagashima's disclosure based on the teachings of Danzer.

Applicants respectfully disagree.

Danzer does not at all mention that amorphous carbon, whether of the hard DLC variety or the softer polymer-like type, could have barrier properties, *e.g.*, gas permeability.

In fact, the only properties of soft, polymer-like amorphous carbon expressly recited by Danzer are set forth in the paragraph bridging columns 1 and 2 of page 119. Therein, Danzer discloses that they may be used as *intermediate* layers for material composites or for healing processes on defect sites of carbon fibers, thereby improving their *mechanical* properties. Therefore, although Danzer may disclose using it as an intermediate layer to reinforce composite structures, or using it as a putty to reinforce fiber structures, Danzer does not at all disclose or suggest the claimed amorphous carbon material with a polymer tendency applied as a *barrier* coating on a substrate of the polymer material.

It is completely unexpected from the combined disclosures of Nagashima and Danzer that the presently claimed container with a heterogeneous structure would overcome prior art mechanical disadvantages, *e.g.*, layers becoming unstuck, while at the same time exhibiting reinforced barrier properties.

Benmalek does not cure the deficiencies of Nagashima and Danzer.

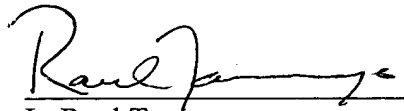
Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw these §103 rejections.

AMENDMENT
U.S. Appln. No. 09/647,005

IV. Conclusion

Reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, he is kindly requested to contact the undersigned at the telephone number listed below.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read "Raul Tamayo", written over a horizontal line.

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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claims 9-24 are canceled.

The claims are amended as follows:

1. (TWICE AMENDED) A container ~~such as a bottle or flask~~ having a heterogeneous structure, comprising ~~made heterogeneously from~~ a material with a barrier effect and a polymer material, wherein the material with a barrier effect is an amorphous carbon material with a polymer tendency which is applied as a coating on a substrate of the polymer material.

2. (TWICE AMENDED) A container as claimed in claim 1, wherein the material with a barrier effect is a nano-composite ~~based on~~ comprising amorphous carbon with a polymer tendency.

3. (TWICE AMENDED) A container as claimed in claim 2, wherein the material with ~~the a~~ barrier effect is a nano-composite ~~based on~~ comprising an amorphous carbon with a polymer tendency ~~incorporating~~ and metal atoms.

6. (TWICE AMENDED) A container as claimed in claim 1, wherein the polymer material is a polyolefin ~~or a polyester, in particular PET or PEN.~~

Claims 25-28 are added as new claims.